

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1-9 (Canceled)

10. (Currently Amended) A method for producing a single crystal with pulling the single crystal from a raw material melt in a chamber by Czochralski method, wherein when growing the single crystal, where a pulling rate is defined as V (mm/min), a temperature gradient of the crystal at the vicinity of solid-liquid interface at a central portion of the crystal is defined as G_c ($^{\circ}\text{C}/\text{mm}$), and a temperature gradient of the crystal at the vicinity of solid-liquid interface at a peripheral portion of the crystal is defined as G_e ($^{\circ}\text{C}/\text{mm}$) during growing a straight body of the single crystal, during pulling the single crystal, the temperature gradient G_c of the crystal at the central portion of the crystal and the temperature gradient G_e of the crystal at the peripheral portion of the crystal are controlled by changing a distance between a melt surface of the raw material melt and a heat insulating member provided in the chamber so as to oppose to the surface of the raw material melt, thereby $\Delta G = |G_c - G_e|$ which is difference between the temperature gradient G_c at the central portion of the crystal and the temperature gradient G_e at the peripheral portion of the crystal is $0.5^{\circ}\text{C}/\text{mm}$ or less, and also V/G_c ($\text{mm}^2/^{\circ}\text{C} \cdot \text{min}$) which is a ratio of the pulling rate V and the temperature gradient G_c at the central portion of the crystal is controlled so that a single crystal including a desired defect region is grown.

11. (Previously Presented) The method for producing a single crystal according to Claim 10, wherein the single crystal is pulled with keeping the pulling rate V constant.

12. (Previously Presented) The method for producing a single crystal according to Claim 10, wherein V/G_c is controlled so that the defect region of the single crystal to be grown is N region over a whole plane in a radial direction.

13. (Previously Presented) The method for producing a single crystal according to Claim 11, wherein V/G_c is controlled so that the defect region of the single crystal to be grown is N region over a whole plane in a radial direction.

14. (Previously Presented) The method for producing a single crystal according to Claim 10, wherein the distance between the surface of the raw material melt and the heat insulating member is changed by adjusting an elevation rate of a crucible containing the raw material melt to move a level of the raw material melt up and down and/or by moving a position of the heat insulating member up and down.

15. (Previously Presented) The method for producing a single crystal according to Claim 11, wherein the distance between the surface of the raw material melt and the heat insulating member is changed by adjusting an elevation rate of a crucible containing the raw material melt to move a level of the raw material melt up and down and/or by moving a position of the heat insulating member up and down.

16. (Previously Presented) The method for producing a single crystal according to Claim 12, wherein the distance between the surface of the raw material melt and the heat insulating member is changed by adjusting an elevation rate of a crucible containing the raw material melt to move a level of the raw material melt up and down and/or by moving a position of the heat insulating member up and down.

17. (Previously Presented) The method for producing a single crystal according to Claim 13, wherein the distance between the surface of the raw material melt and the heat insulating member is changed by adjusting an elevation rate of a crucible containing the raw material melt to move a level of the raw material melt up and down and/or by moving a position of the heat insulating member up and down.

18. (Previously Presented) The method for producing a single crystal according to Claim 10, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

19. (Previously Presented) The method for producing a single crystal according to Claim 11, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

20. (Previously Presented) The method for producing a single crystal according to Claim 12, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

21. (Previously Presented) The method for producing a single crystal according to Claim 13, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

22. (Previously Presented) The method for producing a single crystal according to Claim 14, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

23. (Previously Presented) The method for producing a single crystal according to Claim 15, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

24. (Previously Presented) The method for producing a single crystal according to Claim 16, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

25. (Previously Presented) The method for producing a single crystal according to Claim 17, wherein the distance between the surface of the raw material melt and the heat insulating member is 30 mm or more.

26. (Previously Presented) The method for producing a single crystal according to Claim 10, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

27. (Previously Presented) The method for producing a single crystal according to Claim 11, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

28. (Previously Presented) The method for producing a single crystal according to Claim 12, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

29. (Previously Presented) The method for producing a single crystal according to Claim 13, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

30. (Previously Presented) The method for producing a single crystal according to Claim 14, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

31. (Previously Presented) The method for producing a single crystal according to Claim 15, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

32. (Previously Presented) The method for producing a single crystal according to Claim 16, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

33. (Previously Presented) The method for producing a single crystal according to Claim 17, wherein the distance between the surface of the raw material melt and the heat insulating member is changed automatically according to a changing condition obtained by performing an experiment beforehand.

34. (Previously Presented) The method for producing a single crystal according to Claim 10, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

35. (Previously Presented) The method for producing a single crystal according to Claim 11, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

36. (Previously Presented) The method for producing a single crystal according to Claim 12, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

37. (Previously Presented) The method for producing a single crystal according to Claim 13, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

38. (Previously Presented) The method for producing a single crystal according to Claim 14, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

39. (Previously Presented) The method for producing a single crystal according to Claim 15, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

40. (Previously Presented) The method for producing a single crystal according to Claim 16, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

41. (Previously Presented) The method for producing a single crystal according to Claim 17, wherein a changing condition that changes the distance between the surface of the raw material melt and the heat insulating member is adjusted among batches for producing the single crystal.

42. (Previously Presented) The method for producing a single crystal according to Claim 10, wherein a silicon single crystal is pulled as the single crystal.

43. (Previously Presented) The method for producing a single crystal according to Claim 11, wherein a silicon single crystal is pulled as the single crystal.

44. (Previously Presented) The method for producing a single crystal according to Claim 12, wherein a silicon single crystal is pulled as the single crystal.

45. (Previously Presented) The method for producing a single crystal according to Claim 13, wherein a silicon single crystal is pulled as the single crystal.

46. (Previously Presented) The method for producing a single crystal according to Claim 14, wherein a silicon single crystal is pulled as the single crystal.

47. (Previously Presented) The method for producing a single crystal according to Claim 15, wherein a silicon single crystal is pulled as the single crystal.

48. (Previously Presented) The method for producing a single crystal according to Claim 16, wherein a silicon single crystal is pulled as the single crystal.

49. (Previously Presented) The method for producing a single crystal according to Claim 17, wherein a silicon single crystal is pulled as the single crystal.

50. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 10.

51. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 11.

52. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 12.

53. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 13.

54. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 14.

55. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 15.

56. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 16.

57. (Previously Presented) A single crystal produced by the method for producing a single crystal according to Claim 17.